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(21) International Application Number: PCT/SE88/00652 (22) International Filing Date: 30 November 1988 (30.11.88) (31) Priority Application Number: 8704832-8 (32) Priority Date: 1 December 1987 (01.12.87) (33) Priority Country: SE (71) Applicant (for all designated States except US): C.HED- WARD.MEDI-TEAM AB [SE/SE]; Källviksvägen 22, S-421 66 Västra Frölunda (SE). (72) Inventors; and (75) Inventors/Applicants (for US only) : STRID, Lars (SE/ SE); Raketgatan 5, S-413 20 Göteborg (SE). HED- WARD, Christer [SE/SE]; Källviksvägen 22, S-421 66 Västra Frölunda (SE).	(74) Agents: GRAUDUMS, Valdis et al.; Albihn West AB, Stora Nygatan 15, S-411 08 Göteborg (SE). (81) Designated States: AT (European patent), BE (Euro- pean patent), CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (Euro- pean patent), IT (European patent), JP, LU (Euro- pean patent), NL (European patent), NO, SE (Euro- pean patent), US. Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>	
(54) Title: PREPARATION FOR DENTAL TREATMENT AND METHOD FOR PRODUCTION OF THE PREPAR- ATION (57) Abstract Preparation for dental treatment in the form of a substance as a caries-detaching liquid. The preparation consists of three nitrogen-containing compounds and sodium hypochlorite, which compounds have different charge states; neutral and negative net charge and positive net charge. According to an advantageous embodiment, the nitrogen-containing compounds are fed in a common stream to a stream of the sodium hypochlorite solution, so that a mixing of the solutions takes place directly ahead of the site where the effect is to be obtained during the dental treatment.		

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Preparation for dental treatment and method for production of the preparation

Technical field:

5 The present invention relates to a preparation for dental treatment and to a method for production of the preparation.

10 As is known, caries represents an attack on the physiological substance, dentine, which constitutes the tooth substance in humans and animals. If a carious site is not treated, there is a high risk of the attack spreading. Mechanical treatment has been used to a large extent in order to remove the attacked tooth substance. However, it has been found that certain chemical compounds are
15 effective in breaking up caries. A compound known in this connection is sodium hypochlorite.

Technical problem:

20 However, the said compound irritates the mucous membranes when it comes into contact with these during spraying of a tooth. Attempts to reduce the aggressive effect of hypochlorite on the mucous membranes have, however, resulted in the caries-detaching effect being reduced, so that it has not been possible to achieve a satisfactory result upon dental treatment.

25 Solution:

The preparation according to the invention has the form of a caries-detaching liquid consisting of sodium hypochlorite and nitrogen-containing chemical substances, which consist of three nitrogen-containing compounds with
30 different charge states; neutral and negative net charge and positive net charge. They preferably consist at least partially of amino acids. In the method, the nitrogen-containing compounds are fed in a common stream to a stream of the sodium hypochlorite solution, so that a
35 mixing of the solutions takes place as near as possible ahead of the site where the effect is to be obtained

during the dental treatment.

Advantages:

5 The present invention provides a preparation which, despite having a strong caries-detaching effect upon treatment, has a limited aggressive action on the mucous membranes.

10 The method, which is connected with the final production of the preparation, contributes to the said effect of maintaining a good detaching effect with respect to caries but a limited aggressiveness to the mucous membranes.

Preferred embodiments:

15 Dentine, the tooth substance, contains amino acids bound to each other in long chains. The side chain of an amino acid can either be neutral or have a negative or a positive net charge. A mixture of three N-chlorinated, organic compounds, preferably amino acids, where one is neutral, one has a negative net charge and the last a positive net charge, therefore gives better results as a
20 caries-detaching substance than does the use of one type of N-chlorinated compound.

25 The basic idea is that three nitrogen-containing compounds with different charge states are produced and used as a preparation for dental treatment and detachment of caries in mixture with sodium hypochlorite. The organic compounds are expediently present in the form of an acid, a neutral and a basic amino acid.

30 More precisely, the preparation according to the invention consists partly of sodium hypochlorite which, as mentioned, has a strong detaching effect on the carious substance, and three nitrogen-containing compounds which are preferably amino acids and which, when mixed with the sodium hypochlorite, are N-chlorinated and give compounds containing an active chlorine which, while retaining a

carries-detaching property, does not exhibit the aggressiveness of sodium hypochlorite towards mucous membranes.

5 The chlorination of the amino acid or the organic compound containing an -NH- group takes place with sodium hypochlorite at a pH of about 11 and with an excess of the amino compound. The reaction between sodium hypochlorite and amino compound is extremely fast. However, the resulting N-chlorinated organic compound is not stable, but is broken down relatively quickly.

10 It is therefore proposed according to the invention that the method for final production of the preparation be connected to the dental treatment by means of the mixing of sodium hypochlorite and the excess of organic compound taking place as near as possible to the carious tooth
15 which is to be treated. This means that these two substances are mixed near the tip of the cannula which is used for injecting the preparation, i.e. as close to the outlet of the cannula as possible.

20 For the dental treatment an injection nozzle is designed in the form of a cannula. The cannula has a discharge opening, which is intended to be directed towards that area of a subject's set of teeth which is to be treated. Two channels lead to the discharge opening. Both the channels are connected to a pressure source for two
25 liquids, one for each channel. These liquids are designated below by A and B.

The liquids are to be led into the respective channels at such a pressure that a discharge rate suitable for dental treatment is achieved. The pressure can be obtained
30 either by means of pumps, which convey the liquids from containers, or by means of the liquids being fed from pressure containers.

Of the two liquids one is a mixture of organic compounds, as has been mentioned above, and this liquid is designated

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nated below by A. The second liquid is sodium hypochlorite, as has also emerged from the above, and this liquid is designated by B. When the two liquids are mixed at the discharge opening, where the two channels run together, the sodium hypochlorite provides for an N-chlorination of the organic -NH- compound, which is supplied in excess, and the stream of the caries-detaching preparation according to the invention is obtained. The caries-detaching effect begins when the preparation flows onto the surface of the tooth, and the detached, carious substance is led away by the stream, as are other undesirable substances on the surface of the tooth, such as plaque.

According to the invention the two liquids A and B are composed in the following manner:

Basic composition

A.

The sodium salts of an acid, a neutral and a basic amino acid are mixed in such a ratio that, after chlorination and depending on different reaction rates, they are present as an N-chlorinated derivative in the ratio 1:1:1. The total concentration of the amino acids should be about 0.1-0.2 M. The solution should moreover contain so much sodium chloride that the mixture with solution B (see below) is isotonic and has a pH of about 11.

B.

Sodium hypochlorite, about 0.014 M in water.

If it is assumed that A and B are brought together at the discharge opening in similar volume amounts per unit of time, then the above concentrations are applicable. If the volume amounts are different, the proportions must be changed accordingly.

Example:

Solution A can be a mixture of the sodium salts of glutaminic acid, leucine and lysine with a total concentration of about 0.1 M and a pH of about 11.

5

Solution B is supplied as stated.

Patent Claims:

1. Preparation for dental treatment in the form of a caries-detaching liquid consisting of sodium hypochlorite and nitrogen-containing chemical substances, characterized in that the nitrogen-containing chemical substances consist of three nitrogen-containing compounds with different charge states; neutral and negative net charge and positive net charge, and preferably, in a manner known per se, consisting at least partially of amino acids.
2. Preparation according to patent claim 1, characterized in that the amino acids are incorporated as sodium salts of an acid, a neutral and a basic amino acid and in that this solution is given a pH of about 11.
3. Preparation according to patent claim 1, characterized in that it contains sodium chloride in an amount such that the solution is isotonic at a pH of about 11, the total concentration of the amino acids being preferably about 0.1 M and that of the sodium hypochlorite about 0.014 M in water.
4. Preparation according to patent claim 3, characterized in that the sodium salts consist of glutaminic acid, leucine and lysine.
5. Method for producing the preparation according to any one of patent claims 1-4, characterized in that the nitrogen-containing compounds are fed in a preferably common stream to a stream of the sodium hypochlorite solution, so that a mixing of the solutions takes place as near as possible ahead of the site where the effect is to be obtained during the dental treatment.

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE88/00652

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC 4		
A 61 K 7/22		
II. FIELDS SEARCHED		
Minimum Documentation Searched 7		
Classification System	Classification Symbols	
IPC 4	A 61 K	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT 8		
Category *	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 13
A	DE, A, 2 335 554 (NATIONAL PATENT DEVELOPMENT CORP.) 7 March 1974 see the whole document	1-5
A	AU, A, 62630/73 (NATIONAL PATENT DEVELOPMENT CORP.) 22 May 1975 see the whole document	1-5
A	FR, A, 2 196 784 (NATIONAL PATENT DEVELOPMENT CORP.) 22 March 1974 see the whole document	1-5
A	EP, A1, 0 224 599 (NATIONAL PATENT DEVELOPMENT CORP.) 10 June 1987 see the whole document	1-5
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Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
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International Searching Authority	Signature of Authorized Officer	
Swedish Patent Office	Dagmar Järvmän	